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The Director of Central Intelligence

Washington, D.C. 20505

Resource Management Staff

DCI/RM 79-2373
13 September 1979

NSC REVIEW COMPLETED

MEMORANDUM FOR: DCI Space Policy Working Group

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FROM: [redacted]
Chairman

SUBJECT: Report of Space Policy Alternatives on Integrated Remote Sensing (U)

Attached provided for your information. PRC meeting is scheduled for 25 September. (U)

[redacted]

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Attachment:
Space Policy Alternatives on Integrated Remote Sensing for Policy Review Committee (Space)

UNCLASSIFIED WHEN DETACHED FROM ATTACHMENT

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SUBJECT: Report of Space Policy Alternatives on Integrated Remote Sensing (U)

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NATIONAL SECURITY COUNCIL
WASHINGTON, D.C. 20506

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SECRET ATTACHMENT

August 31, 1979

MEMORANDUM FOR:
THE SECRETARY OF STATE
THE SECRETARY OF DEFENSE
THE SECRETARY OF INTERIOR
THE SECRETARY OF AGRICULTURE
THE SECRETARY OF COMMERCE
THE SECRETARY OF ENERGY
THE DIRECTOR, OFFICE OF MANAGEMENT AND BUDGET
THE ASSISTANT TO THE PRESIDENT FOR DOMESTIC AFFAIRS AND POLICY
THE ADMINISTRATOR, AGENCY FOR INTERNATIONAL DEVELOPMENT
THE DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY
THE CHAIRMAN, JOINT CHIEFS OF STAFF
THE DIRECTOR OF CENTRAL INTELLIGENCE
THE ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
THE DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY
THE DIRECTOR, NATIONAL SCIENCE FOUNDATION

SUBJECT: Report of Space Policy Alternatives on Integrated Remote Sensing (U)

Attached is a report of space policy alternatives on possible integration of US remote sensing systems and programs in response to PD/NSC-42. It was prepared by an interagency task force chaired by NASA and will serve as the basis for a Policy Review Committee (Space) meeting to be scheduled in the future. The polar meteorological satellite issue will also be discussed briefly. (U)

Christine Dodson
Staff Secretary

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SPACE POLICY ALTERNATIVES ON INTEGRATED REMOTE SENSING

FOR

POLICY REVIEW COMMITTEE (SPACE)

AUGUST 28, 1979

SECRET/NO FOREIGN

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SPACE POLICY ALTERNATIVES ON INTEGRATED REMOTE SENSING
FOR POLICY REVIEW COMMITTEE (SPACE)

AUGUST 28, 1979

I. OBSERVATIONS AND CONCLUSIONS

A. SCOPE

This overview reports the deliberations of the Phase II Interagency Task Force study considering possible integration of U.S. remote sensing systems and programs from the management, institutional, and policy perspective. It responds to the direction of PD/NSC-42 and further guidance from the Director of the OMB. A Phase I report, covering technical and cost aspects of remote sensing integration has been completed and forwarded. The Phase II Task Force has followed, in large part, the Phase I categorization of technical integration approaches. In addition, the Phase II Task Force relied upon the general conclusions of the separate study that examined potentials for private sector involvement. (U)

This Section outlines observations and conclusions that are important to the consideration of national remote sensing activities, whether viewed separately or as a single entity. Separate discussion of the management options for meteorological, oceanic, and terrestrial remote sensing programs are included in Sections II, III and IV. Section V lists relevant references for the Phase II study. (U)

B. SEPARATION OF GOVERNMENT SECTORS

In principle, a single agency could manage a single remote sensing program serving all U.S. needs (whether civil, military, or intelligence, whether domestic or international) in the acquisition and distribution of global observational data. Upon analysis, the various programs, institutions, and policies in being today do not lend themselves easily to any dramatic coalescence that would both improve services and reduce costs. This is because of the difference in the levels of technical maturity among the various programs, in the different data requirements of the user constituencies, and in the different content-specific data and management policies. If, however, the existing disparities among civil sector program requirements, capabilities, and policies could be accommodated within a single civil management structure, this Administration could put forward a significant remote sensing initiative. (C)

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C. SATELLITE REMOTE SENSING MANAGEMENT CONSIDERATIONS

Polar Orbiting Meteorological Satellites. The majority of the Phase II Task Force concluded that the integration of civil and military systems makes programmatic and economic sense when the requirements to be met are virtually identical, when the security issues do not impede civil activities, and when the civil data management policies do not create military security, operational, or survivability problems. A review of

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Oceanographic Satellites. An examination of space oceanography possibilities reveals a present congruity of civil and military data requirements, with few problems of data management or security other than those of foreign participation. In this case, joint civil-military activity seems a logical and economic next step beyond R&D, leading perhaps to an operational capability. Separate options covering this area are discussed in Section III. (U)

Converged Oceanographic and Meteorological Systems. The Phase I study concluded that both the meteorological and oceanographic observational low-earth-orbit systems could be combined. The majority of the Phase II Task Force has concluded that the technical risks would be high in combining both civil and military operational meteorology with developmental oceanography in a single system. This program was not documented as a management issue at this time but it remains available for future consideration. (U)

Terrestrial Observation Satellites. Civil operational terrestrial remote sensing--decoupled from classified activities--presents one major management question: What civil Federal organization should take the lead in developing and managing an operational program that builds upon the technologies demonstrated both in classified and civil activities? This question is discussed in Section IV. The necessary transition steps; the necessary interagency priority and requirements mechanisms; and the need for responsiveness to Federal, state and local government, private sector, and international users are also outlined. (C)

The majority of the Phase II Task Force concluded that a selection should be made as soon as possible. The selection should take into account experience in space operations, data management and distribution, terrestrial applications, and international participation. The Department of Agriculture, Commerce, and Interior are each willing to accept this operational role. The diversity of terrestrial remote sensing data users and uses dictates that an authoritative interagency mechanism be established to oversee and guide the conduct of such an operational program. (C)

Supporting Research and Development. In all three civil space remote sensing cases--atmospheric, oceanic, and terrestrial--the majority of the Phase II Task Force concluded that responsive and continuing research, development, and demonstration activities are necessary adjuncts to sound operational programs. Separation of research and operations avoids conflict of priorities within a single organization. Continuity and responsiveness permit smooth introduction of new or improved capabilities after an adequate experience has been established. (U)

D. COMMON POLICY CONSIDERATIONS

Remote sensing involves the acquisition and preprocessing of data for purpose of analysis and eventual transformation into usable information. While remote sensing is often characterized by the regime being observed (atmosphere, ocean, land), most informational products require combining data sets from both space and conventional sources. Agricultural crop production forecasts, for example, require data on weather, crop distribution, soil types, and local conditions gathered from a wide range of sources. The informational uses to which space remote sensing data are applied differ significantly. Some information functions, like intelligence, domestic and foreign crop forecasting, or law enforcement, are primarily for internal use by Federal agencies. Some applications, like mapmaking, disaster warning, or weather forecasting, are provided as public services. Other information functions, like mineral exploration, support developments by the private sector. (C)

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This complex matrix of regimes, requirements, and products has led the majority of the Phase II Task Force to identify a number of related cross-cutting policy questions which pervade remote sensing programmatic discussions. These deal with national security, data treatment, international involvement, private sector involvement, and future integration possibilities. These are set forth below as a backdrop for the program and management decisions under consideration. (U) 25X1 NSC

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Data Treatment. Most federally acquired civil unclassified remote sensing data, by tradition, policy, and law, have been supplied to date as public services--i.e., available to anyone at the cost of reproduction and freely disseminated domestically and internationally. As operational civil systems become more sophisticated, the political and economic values of these data will increase significantly. No policy framework relates the value of data for a particular beneficiary to the cost of its acquisition, processing, or dissemination. If data are to be treated as "property" or as a commodity, changes in law and policy would be necessary. (U)

If data are to continue to be supplied as public services, regulator mechanisms will be required to protect civil data from misuse or exploitation inimical to overall U.S interests. (U)

International Involvement. Remote sensing from space is inherently global and therefore has international implications. U.S. civil remote sensing programs--both R&D and operational--have generally benefited from international participation and interest. Open U.S. civil space programs have gained international support for a variety of U.S. positions in different arenas. Countries that share in U.S. data have supported the U.S. in international forums where freedom of action for U.S. space programs is at stake. Foreign contributions of instruments to U.S. spacecraft have provided dollar benefits to U.S. programs. (U)

These benefits have been achieved at a certain cost. Foreign countries have capitalized on U.S. space segment investments at a small fraction of the U.S. costs. Some have developed selective competitive positions in both space and ground technologies, threatening U.S. leadership and potential markets. An issue such as "open dissemination" versus "prior consent" allows nations to exercise leverage on U.S. civil programs through their ability to forward or retard U.S. interests in international forums. The balance between U.S. national and international interests in remote sensing will always remain dynamic. U.S. policies must accommodate evolving national program objectives and shifting international priorities; an example would be the U.S. support of internationalized remote sensing. (C)

Private Sector Involvement. The Private Sector Involvement Study--based on a survey of private firms and individuals outside the Federal Government--concluded that the present market risks are such that private industry will not assume a significant role in civil remote sensing operations without guarantees against loss. These guarantees include combinations of financial subsidy, monopoly, data ownership, and product selectivity. Administration policy supports a larger and more independent private sector role in remote sensing. While security, data management, and international questions must be addressed on a continuing basis, the private sector is being encouraged to invest in, and share the risks and profits of, civil remote sensing operations. Given current industry proposals under development, an expanded role that includes provision of specialized services to particular markets appears the most feasible in the near future. (U)

Future Integration Possibilities. One approach to integration focused on combining military and civil instrumentation on a minimum number of spacecraft. This has difficult management and policy implications. Another approach would be an institutional integration of all civil operational remote sensing within a single Federal service agency (which could also be the civil component in joint or coordinated programs with the military)*. Given sufficient visibility, stature, and budgetary recognition, such an organization could manage the operational data acquisition, preprocessing, and initial distribution functions for all regimes and users. Because no one agency today is responsible for all space remote sensing data and information, the selected agency would have to respond to the priority and policy direction of the authoritative executive program Board suggested in each of the options papers. The consolidation of all civil remote sensing within a single civil Cabinet Department could lead to improved coordination among the involved sectors and to the further integration of requirements and systems. Multiple responsibilities for individual civil operational systems, on the other hand, would preserve separation and might hamper integration. (U)

*The Interior Task Force Representative believes that meteorological and oceanographic satellite activities could be managed by a combination military and civil agencies but that terrestrial observations should be conducted solely by a civil agency.

II. POLAR METEOROLOGICAL SATELLITE PROGRAM OPTIONS

(See polar meteorological satellite options paper prepared by the Interagency Task Force on Integrated Remote Sensing Systems, dated July 13, 1979 and distributed by the National Security Staff Secretary on July 27, 1979.) (U)

III. OCEAN OBSERVATION SATELLITE MANAGEMENT OPTIONS

A. ISSUE FOR CONSIDERATION

How should the United States proceed with the development and management of space oceanography? (U)

B. BACKGROUND

Task. PD/NSC-42 directed, in relation to a proposed National Oceanic Satellite System (NOSS), that "the Policy Review Committee (Space) will assess the policy implications of combining civil and military programs as part of this process." In relation to study of an integrated remote sensing system, PD/NSC-42 directed NASA to "chair an interagency task force to examine options for integrating current and future potential systems into an integrated national system. This review will cover technical, programmatic,. . . ., and institutional arrangements." (U)

Current Program. NOAA, NASA, and DOD have been flying ocean observing instruments on experimental and operational satellites for years, e.g., on the TIROS, NIMBUS, GEOS, NOAA and DMSP series. The infrared radiometers on NOAA series provide information on the sea surface temperatures in cloud-free areas which has been used by NOAA to prepare maps of oceanic fronts and major circulation patterns in the Great Lakes and the ocean. DOD has developed techniques for direct preparation of sea surface temperature maps from the IR data obtained from the DMSP. The altimeter on GEOS-3 has provided a definite datum on sea surface height; and the color scanner and scanning radiometer on NIMBUS have had practical application. DOD is pursuing design work on a four-channel passive microwave imager to be flown for experiemental purposes on a DMSP satellite. (U)

Instruments of most of these types and a synthetic aperture radar were combined on the NASA experimental Seasat oceanographic satellite to confirm their utility for making systematic oceanographic observations. Canada and the European Space Agency operated direct reception stations under MOU's resulting from their proposals to NASA. ALthough the satellite failed a few months after launch, data analysis has confirmed the utility of the instrument complement. (U)

In the fall of 1977, the interagency Program Review Board convened a tri-agency (NASA-DOD-DOC) group to evaluate what steps should follow Seasat. Fundamental to the task is the agreed list of deficiencies in our national capability: (

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To address these needs, the group defined a tri-agency limited operational demonstration program, National Oceanic Satellite System (NOSS), which all three agencies proposed for start in FY 1980, and will propose again. The Office of Management and Budget deferred the program and subsequently requested reviews of reduced cost configurations and alternative cost-sharing arrangements, which were conducted by the tri-agency management team and provided to the integrated remote sensing task force. For the purpose of discussion of issues the NOSS proposed in FY 1980 will be used. It is outlined as follows:

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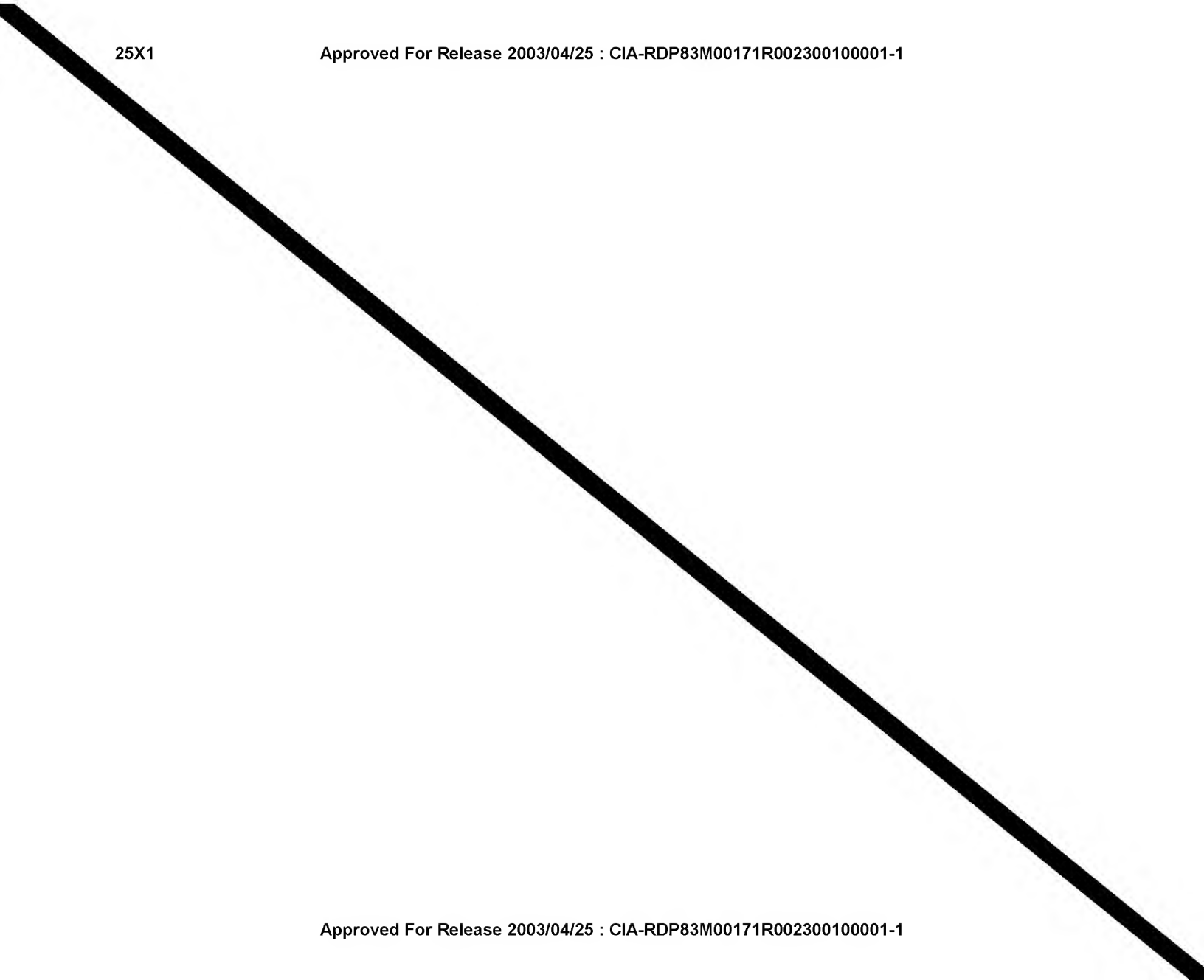
— The ground segment task to design, develop, and demonstrate a centralized operational primary data processing and distribution capability that meets the user requirements. (U)

— The proposed schedule has a five-year development and installation period, followed by five years of service demonstration; the decision to commit to service continuity beyond the demonstration period would be made after three years of experience in meeting practical user needs. (U)

— A tri-agency joint project management structure is implementing the development and acquisition activities, for which NASA will serve as system integrator. Once on-orbit operations begin, it is planned for the responsibility to shift to a joint DOC-DOD (NOAA-USN) spacecraft operations, data processing and distribution management team. (U)

— Each participating agency would budget for NOSS according to an agreed 10-year plan that allocates responsibility for specific elements during the five years of development and five of operation. (U)



C. KEY CONSIDERATIONS

Implementation Goals. Requirements have been identified for precise and timely data on ocean properties. In the long term at least portions of these data will probably require classification for national security reasons. The initial steps represented by the demonstration phase--like the planned NOSS--must be taken so that any transition to an operational system is economical and effective. (C)

Policy Framework. There is no ongoing operational space oceanography program. A program-specific policy framework has not developed to the same extent it has in the meteorological area, although the same basic policy structure (Presidential Directives, legislation, and treaties) is broadly applicable.

1. "The United States will maintain current responsibility and management relationships among the sectors focused on civil, defense, and national intelligence objectives." PD/NSC-37 (C)

2. "The United States will pursue space activities to increase scientific knowledge, develop useful civil applications of space technology, and maintain United States leadership in space. PD/NSC-37 (U)

3. "The United States will conduct international cooperative space-related activities that are beneficial to the United States scientifically, politically, economically, and/or militarily." PD/NSC-37 (U)

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5. "Close coordination, cooperation, and information exchange will be maintained among the space sectors to avoid unnecessary duplication and to allow maximum cross-utilization, in compliance with security and policy guidance, of all capabilities." PD/NSC-37 (U)

6. "Data and results from the civil space programs will be provided the widest practical dissemination, except where specific exceptions defined by legislation, Executive Order, or directive apply." PD/NSC-37 (C)

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7. "The United States will conduct those activities in space which are necessary to national defense. [redacted]

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8. "....activities peculiar to or primarily associated with the development of weapon systems, military operations, or defense of the United States....shall be the responsibility of and directed by the Department of Defense...."; NASA shall conduct civil space R&D. Space Act (U)

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Congressional Interests. Success in multi-agency budgeting requires an Administration commitment to a long-term effort, and full Congressional understanding and acceptance of joint program principles. Reaction to date in the Congress has been favorable. (U)

User Interests. Lacking specific declarations to the contrary, both the domestic and international communities would expect any follow-on activities to conform to the R&D pattern of open data, essentially free data services, and international participation. The manner in which these expectations should be treated in the space oceanography program is a significant policy issue which must be faced in the implementation of a program like NOSS. (U)

A unique characteristic of spacecraft oceanography today is the absence of differences in the data and operational demonstration requirements of the user communities--both civil and military. This unanimity of purpose should lead to perceptions of the programs quite different from those that are obtained in the meteorological and terrestrial areas. (U) 25X1 NSC

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International Considerations. Foreign participation could involve: direct reception of data from the satellites; transmission of data through a relay from the U.S.; and/or provision of foreign components on U.S. spacecraft. Foreign participation may be valuable for technical as well as for foreign policy purposes. (U)

The mixing of civil and military programs as in other areas of remote sensing can be expected to give rise to some international reaction. That reaction should be manageable to the extent that there are opportunities for obtaining the unclassified data and for international participation. (C)

Pricing Considerations. Unclassified data could be made available on a non-discriminatory basis worldwide. Price of the data should be determined by the appropriate reviewing board. (U)

D. ALTERNATIVES

There are two major decision areas affecting the eventual establishment of an operational oceanographic remote sensing system: the configuration of the space segment, and the management of the satellite oceanography program. (U)

Configuration of the Space Segment. Two options appear viable and were discussed in the Phase I report. The first option is based on a separate, dedicated spacecraft for the operational demonstration; the second is the integration of the oceanic system with the operational polar meteorological satellites. (U)

Option 1. Dedicated Spacecraft

This is the option outlined as NOSS above. Briefly, a near-polar orbiting, shuttle launched spacecraft would carry an array of sensors in an orbit chosen to maximize the utility of the data for the purposes listed in Table 1. The program would take maximum advantage of instrument and spacecraft technology already developed for programs such as Seasat, Nimbus, and others. (U)

Advantages

-- Provides operational independence from other programs, thus affording the greatest flexibility for pursuing the demonstration objectives. (U)

-- Permits the selection of the orbit which provides the best coverage of the ocean and the greatest accuracy of observations for meeting the oceanic objectives. (U)

— Has least program technical risk and cost uncertainty, since it is not as complex a spacecraft development as would be necessary for the integrated approach. (U)

— Does not impact the reliability and continuity of the operational METSAT program due to introduction of new technology on a demonstration basis. (U)

Disadvantages

— Correlation of the oceanic data with related data from the separate meteorological satellites would be more difficult because of the different orbits and data coverage times. (U)

— May have increased costs. (U)

Option 2. Integration with the Polar-Orbiting Meteorological Satellite

The Phase I study concluded that the principal extant requirements for both atmospheric and oceanic observations could be met with a judicious selection of instruments aboard a constellation of three satellites designed for a fully converged METSAT system, plus a new, free-flying, microwave radiometer satellite. This total system would cost some $900 million for the space segment in the period from FY 1981 to FY 1992, implying a saving of an additional $86 million over what could be realized by converging only the meteorological instruments. (U)

Advantages

— There may be some cost saving; the amount is uncertain. (U)

— Synergism in the use of data from the oceanic and meteorological sensors would be increased for some applications. (U)

— Technical integration forces management and system integration. (U)

Disadvantages

— The technical risks would be higher. (U)

— Integration of the oceanic demonstration program with the operational meteorological program could have negative conse quences for both. (The meteorological program requires the prescribed, reliable delivery of services to users; these services could be disrupted by the demonstration program using the postulated new technology. (U)

— A merger of the oceanic satellite with the meteorological satellites could destroy some flexibility required to complete the development of an oceanic satellite capability. (U)

— The orbit selected would be a compromise between the oceanic and meteorological requirements. Assuming that the orbit would have the same inclination as the present meteorological satellites, then both the measurement of ocean currents and the mapping of polar ice would suffer. (U)

— Mandates the immediate development of all new spacecraft within tight deadlines. (U)

Management Options. If the decision is made to integrate the oceanic and meteorological satellites as detailed above, the management arrangement should be determined in consonance with the decision regarding management of the polar orbiting meteorological satellites. If the decision is for dedicated spacecraft for the future oceanic operational demonstration phase, then the management options are as follows:

Option 1. Joint DOD-DOC-NASA Management

Under this approach, a joint DOD-DOC-NASA management organization would be established to design, develop, procure, operate, and task the ocean satellite space and ground segments. Supporting research and space development and procurement would be tasked from the joint office to NASA, either with or without reimbursement. The management organization would take the form of a joint office staffed by all three agencies. To assure adequate policy review, there should be a Policy Committee composed of a senior official from each of the involved agencies (e.g., State, Defense, Commerce, DCI, and NASA) chaired by the member from one of the principal funding agencies. The Committee would forward unresolved issues to the PRC(S) for policy consideration. Its operations would not affect the established informational, resource management, or regulatory responsibilities of the user community and agencies. Budgeting would be divided among DOD, DOC, and NASA. (U)

Advantages

-- Reduces the pressure to establish duplicative oceanic systems to serve civil and military requirements. (U)

-- Provides a broader interagency consumer/user forum for data service requirements. (U)

-- Preserves the option for future further integration of remote sensing functions under joint management in the future. (U)

-- Builds on the momentum established in the NOSS planning. (U)

-- Serves as a useful test of interagency remote sensing program management, as encouraged in PD/NSC-42. (U)

-- If present internation cooperation and data policies applicable to terrestrial and atmospheric observations were applied here, this would not cause unmanageable foreign reactions. (U)

Disadvantages

-- Requires a new and complex interagency management and budget structure for both the civil and military communities. (U)

-- Might reduce responsiveness of the overall system to its user. (U)

-- Funding priority decisions in any year by any one agency or its respective Congressional authorization or appropriation Committees could put the entire program in jeapardy. (U)

Option 2. Single Agency Management

Under this approach, there are two sub-options: either DOC or DOD would be selected to fund, develop, procure, and demonstrate a single oceanic satellite system for the U.S., responsive to all national interests. The selected operating agency (DOD or DOC) would establish an inter-agency advisory board (representing State, DOC, DOD, DCI, NASA) to assure that external requirements are understood and that the system is responsive to other than the operator's requirements. Trade-offs and operational constraints that affect an agency's requirements would be appealed by the concerned agency head to the PRC(S) for resolution. (U)

Advantages

— Streamlines budgetary, development, procurement, and management activities through centralization in a single agency. (U)

— If present international cooperation and data policies applicable to meteorological and terrestrial observations were applied here, this alternative should not cause unmanageable foreign reaction. (U)

Disadvantages

— Requires a potentially adversary interagency coordination structure to assure lead agency understanding of external requirements and encourages conflict between the lead agency and the others (excessive claims for service from agencies not required to pay for them, and valid complaints of non-responsiveness). (U)

— Places either DOD or DOC in the role of developing and operating systems for another sector, which might require changes in policy and law. (U)

— Either the DOD or DOC managed configuration would forego the opportunity to demonstrate successful merging of civil and military interests in oceanography. (U)

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D. OTHER ISSUES

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IV. CIVIL TERRESTRIAL OBSERVATION SATELLITE MANAGEMENT OPTIONS

A. ISSUE FOR CONSIDERATION

How should the Administration implement its commitments to continuity of terrestrial remote sensing data through the 1980's and to moving toward an eventual operational civil earth resources system? (U)

B. BACKGROUND

Administration Commitment. PD/NSC-42, policy statements and testimony by Presidential spokesmen, and the President's message to Congress on science and technology document this Administration's commitment to continuity of data and to an eventual, as yet undefined, operational system. This commitment builds on statements made by each President for the past fifteen years underlining that U.S. civil earth observing systems are for the benefit of all the people of the world. (U)

Study Results. The technical and cost study of potential remote sensing system integration (Phase I) examined the feasibility of incorporating sensing functions into platforms supporting atmospheric, environmental, terrestrial, and oceanic functions within a relatively specific set of orbital constraints and technical configuration assumptions. The high technical risks led to the conclusion that this level of technical integration should not be pursued. The Phase I study concluded that system management assignments and institutional issues have to be resolved before integration at any level could be successful. Terrestrial remote sensing for civil purposes, therefore, will be treated as a separate program function with emphasis on operational systems management and the transition from R&D. (U)

The study of selective declassification of photoreconnaisance imagery in order to serve civil user data needs has shown that a number of civil requirements could benefit significantly from easy access to repetitive and non-repetitive high resolution terrestrial photography. If this photography were unclassified, the number of beneficial uses would increase greatly. However, the security programs are overtaxed by their existing requirements. Declassification of reconnaissance imagery alone--without providing for additional civil tasking of classified space systems--would only be marginally useful since the major emphasis of the photoreconnaissance programs is on the collection of intelligence, in contrast to the civil community's emphasis on U.S. and global repetitive coverage. This review underlines the potential civil values of high quality, high resolution imagery collected in response to civil needs. (S/NF)

The study has been completed of possible approaches to increasing private sector involvement and investment in the ownership and operation of civil terrestrial remote sensing systems. It leads to the conclusions that the private commercial sector is not yet ready or willing to take the capital investment and market risks inherent in a remote sensing system without significant and possibly continuing economic protections--government subsidy, market guarantee, or controlled monopoly. It also concluded that the more integrated the civil terrestrial data services become with other civil and military remote sensing systems, the less probability there is of eventual independent private sector systems. The importance of holding open the possibility of private sector involvement was noted by avoiding the premature establishment of stringent criteria for such participation. The designation of a lead Federal agency responsible for exploring means for further private sector participation was recommended. (U)

Current NASA R&D Programs. Since 1972, experimental polar-orbiting Landsats have been providing routine repetitive (18-day) synoptic (185 km swath width) multispectral data coverage of the globe at an Instantaneous Field of View (IFOV) of 80 meters from the multispectral scanner (MSS) and, now, 40 meters from the panchromatic return beam vidicon. Data can be both stored onboard for later readout to U.S. ground stations and read out directly in real time to cooperating foreign-owned ground stations around the world. Data collected by U.S. stations are available in digital tape or processed image form from Interior's EROS Data Center at essentially the cost of reproduction. Data acquired by foreign stations are publicly available under similar pricing policies. Currently, foreign participants pay $200,000 per year for direct reception of Landsat data within the receiving range of each ground station; seven such stations in six countries are currently operation, with nine more expected to be added by 1985.

In 1982, a new Landsat-D experimental satellite will carry, in addition to the MSS, a seven channel Thematic Mapper (TM) with an IFOV of 30 meters. All Landsat-D data will be collected in the U.S. via the commercial Tracking and Data Relay Satellite System (TDRSS). There will also be provision for local direct readout from the MSS and TM instruments to cooperating foreign ground stations which can receive either or both. Current plans are to develop a higher resolution pointable multispectral experimental instrument capable of providing sample areas of repetitive stereo data for merging with MSS and TM data for 1985 test flights on the Shuttle or on a satellite. (U)

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Remotely acquired data serve a large and diverse population of experimental and operational users. Experimental space data are currently being used operationally for global agricultural assessments, land use classification, geological reconnaissance, and pollution assessments by both the Government and private industry. The most significant differences between the experimental program and an operational effort lie in rapid, timely, economical delivery to the user of usable data products. Current experimental program capabilities do not provide rapid operational service and reliability or protection against single point breakdown. (U)

The existing approved and funded civil experimental program does not provide for assured data continuity through the 1980's. The presently operating Landsat 2 and 3 spacecraft are expected to cease operations by 1981. Since Landsat-D will not be launched until early 1982, a data continuity gap can be expected. Landsat-D is expected to operate until 1985; a backup spacecraft is being built, but has not been approved for launch except in the case of an early failure of Landsat-D. The question of experimental continuity will be taken up in the FY 1981 budget process. (U)

C. CHARACTERISTICS OF AN OPERATIONAL SYSTEM

Responsiveness to User Requirements for Data. Even when aggregated and prioritized, civil user data requirements show a wide range of diversity in terms of frequency of coverage (daily to annually), spatial resolution (5 to 100 meters IFOV), areal coverage (10 km^2 to the globe), spectral response (UV through visible to thermal IR), and delivery time (hours to months). The detailed requirements analysis undertaken in the Phase I study suggests that a selected combination of satellite instruments--MSS, TM, pointable imager, film camera, and imaging radar--would meet almost all the data requirements identified by the user community, both public and private. However, an initial operational system configuration in the late '80's would have to be based upon proven as opposed to experimental space and user technologies. (U)

Management for Multiple User Communities. Given the multiplicity of users, the management of an operational system must maintain a continuing inventory of data requirements and balance competing demands. This requires a willingness to consider changes while providing stability and avoiding domination by any single use or user. Whether the system is operated by a Federal agency or by some form of commercial enterprise with Federal support, it needs a stable budget or source of funds. Division of responsibilities for the system between organizations may lead to loss of system integrity. (U)

Growth Potential. An operational earth observations program may start with a system derived from the Landsat experience. Additional technologies, both space and ground, can be brought on line incrementally as the utility and importance of other sensors are demonstrated. (U)

Agreed Cost/Price Structure. The "operational" concept for land programs has frequently carried the connotation that the data can be treated as a commodity whose sale to users will pay for the entire system. Although this may be a desirable goal which eventually could be attained, it is not a precondition for an operational system. Recovery of total costs may not be reconcilable with the "public good." Many Federal agencies make various types of data and information available as a "public good." Therefore, established prices are designed to recoup only a portion of their costs. Earth observation data could, initially, be treated in the same way. At the same time, an effective operational system must clearly inform each user of the real costs of meeting functional requirements. Only in this way can institutionally approved data requirements be kept realistic. Whether those costs are borne totally by the users or are wholly or partially borne by the Federal Government, there needs to be a simplified means of assessing the cost of the data a user consumes. Data pricing, on the other hand, is a separate and deferrable policy issue. How the sale prices of data reflect actual costs will need to be determined on the basis of social, political and economic criteria. (U)

D. KEY CONSIDERATIONS

Current Policy Framework. While no formal or traditional body of policy specifically focused on operational civil terrestrial observation systems has been enunciated, Presidential Directives, law and Congressional actions, treaties, and agreements provide some guidlines for establishing the balance among possibly conflicting program and policy requirements of an operational civil remote sensing service. (U)

25X1
NSC

1. [redacted]

2. "Data and results from the civil space programs will be provided the widest practical dissemination, except where specific exceptions defined by legislation, Executive Order, or directive apply." PD/NSC-37 (U)

3. 25X1 NSC

[redacted]

4. "The United States shall encourage domestic commercial exploitation of space capabilities and systems for economic benefit and to promote the technological position of the United States, except that all United States earth-oriented remote sensing satellites will require United States Government authorization and supervison or regulation." PD/NSC-37 (U)

5. "The United States shall conduct civil space programs. . .to develop and operate civil applications of space technology; to maintain U.S. leadership in space science, applications, and technology; and to further United States domestic foreign policy objectives." PD/NSC-37 (U)

6. "NASA and Commerce jointly will be the contacts for the private sector on this matter (private sector involvement in remote sensing) and will analyze proposals received before submitting them to the Policy Review Committee (Space) for consideration and action." PD/NSC-42 (U)

7. 25X1 NSC

[redacted]

Congressional Interest. In recent months, both the majority and minority parties in the Senate have again proposed U.S. operational terrestrial observation programs that bear significantly on the alternatives discussed in Section IV:

— Senator Schmitt's Bill (S.657) calls for the creation of a publicly owned, Federally chartered, profit-making corporation under FCC regulation to "serve the needs of the U.S. and other countries." (U)

-- Senator Stevenson's Bill (S.663) calls for an immediate declaration of operational status (starting with Landsat) under initial Federal (NASA) management with a seven-year demonstration period after which an ultimate Federal or private operator would be selected by the President. (U)

An Administration move toward an operational terrestrial observation program might obviate Congressionally directed action. (U)

User Interests. Several classes of users of terrestrial remote sensing data have evolved over the past decade that need to be recognized in the next steps toward operational service. Currently, the major users of experimental earth resources data are various Federal and state government agencies. Foreign users and commercial domestic users follow in that order. All projections agree that the Federal agencies are likely to remain the largest volume consumers of such data for the forseeable future. (U)

A growing class of data consumers are the private sector "value added" procesors--those companies that create saleable products from data. This user class responds to perceived information needs of a broad range of potential public and private customers and should therefore be recognized in the establishment of an operational system. (U)

International Considerations Because of tape recorder unreliability, the desire to promote international acceptance of U.S. remote sensing activities and encourage worldwide evaluation of data utility, foreign participation was an inherent part of the initial Landsat experiment. Open Landsat data availability has been an important element in maintaining the U.S. position supporting the unimpeded right to collect data from space without prior permission of the sensed state. (At present, many non-western states support a concept of prior consent for data dissemination.) To date, a dozen nations have invested in their own ground stations and many more are using experimental Landsat data operationally whether acquired from direct readout stations or from U.S. archival sources. Direct reception of data by foreign stations from an operational system--whether Federally or privately managed--would encourage continued foreign acceptance of U.S. remote sensing satellite activities. In addition, such stations would provide a backup for U.S. data collection activities and would provide the potential for foreign sharing of U.S. operational system costs through increased station access fees. An effort directed toward elimination of foreign direct readout access would, on the other hand, result in serious international reactions. If it is felt necessary to protect the direct readout data stream from unauthorized interception and acquisition, commercial coding techniques could be used with decoding keys provided to participants. This approach would probably be acceptable to foreign users provided they had access to the key on non-discriminatory terms. (C)

Competition to U.S. leadership in civil remote sensing technology and services is growing. France is developing the SPOT satellite which, after launching in 1984, will acquire 10- and 20-meter IFOV data. Japan and ESA (with support from France and Germany) are planning additional earth survey satellite programs for the 1985-1990 period. Canada is discussing participation (possibly through a hardware contribution) in both the French and ESA programs. The USSR has flown a multispectral earth resources camera, developed by the German Democratic Republic, and has offered to acquire data for other countries. These foreign remote sensing satellite programs represent a challenge to U.S. space technology leadership, to the U.S. commercial leadership (in the ground and data processing and analysis hardware areas), and to U.S. prestige abroad (particularly in developing countries where Landsat data are considered highly useful). (U)

Most of the countries operating or committed to funding Landsat ground stations are also planning to upgrade their facilities in order to receive and process data from the Thematic Mapper on Landsat-D. An unresolved issue which could affect these plans stems from export control concerns associcated with the sale of U.S. Thematic Mapper ground station equipment. If these concerns remain unresolved, they could lead to: adverse international reactions; the forced development of indigenous European, Canadian and Japanese capabilities; and the associated loss of U.S. hardware markets. (C)

In the past several years, a number of proposals have been advanced to establish an internationally-managed operational remote sensing system under UN or separate international agency auspices. While this concpet would be well received by the UN and many developing countries, it would not be in the interest of either the U.S. or other space segment operator nations. It would affect U.S. flexibility to optimize for national objectives. Accordingly, the U.S. has argued in the UN and other forums against any efforts to pursue such a possibility. At the same time, and recognizing the inevitability of foreign remote sensing satellites, bilateral discussions are being undertaken with France, ESA and Japan which are aimed at encouraging these countries to make their satellite orbits, downlinks and data formats compatible with those of U.S. systems. These discussions are designed to preserve U.S. flexibility in establishing its operational earth resources system, to defuse potential criticism from other users over the prospect of incompatible satellite systems, and to preserve the options for possible future, nationally operated, complementary and mutually beneficial remote sensing satellites. (U)

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E. ALTERNATIVES

There are three areas of decision to consider in the process of moving toward a civil operational system: (1) The selection of the Federal management mechanism to plan and execute the next steps; (2) The scope and extent of private sector involvement to be sought; and (3) The range of international participation desired in an operational program. Of these, the selection of a Federal mechanism is by far the most critical and is treated first in some depth. (U)

Federal Management Mechanisms. Whether the Federal Government manages a civil terrestrial observation space system in the operational phase or eventually transfers it to another sector, there is a requirement for an initial Federal program management structure and for a continuing Federal coordination and regulation. A Federal charter must include meeting the institutionally approved priority data requirements of the entire civil community--public, private, and international. A key mechanism that applies to any of the alternatives outlined below is the establishment of an interagency, inter-sector Program Board. The Board would include representatives from the involved Federal organizations (e.g., EOP, DOS, DOD, DOI, DOA, DOC, DOT, DOE, AID, DCI, EPA, NASA). Organizations such as the National Governor's Association and the National Conference of State Legislatures would

also be involved. The role of the Board, chaired by a senior Federal official from the lead agency or selected by the President, would be to oversee the management of the overall program with particular emphasis on: (1) The aggregation and inventory of approved requirements; (2) The prioritization of data services; (3) The provision to user agencies and NASA of R&D guidance; (4) The maintenance of working interfaces with military and other program data sources useful to the civil community; and (5) Interagency/intersector coordination and information exchange. The Board would forward unresolved issues to the PRC(S) for policy consideration. Its operations would not affect the established information, resource management, or regulatory responsibilities of the user community and agencies. (U)

The three broad choices of an executive agent for the operational program responsive to the Board are:

- o A new Federal organization;
- o A joint multiagency approach; or
- o An existing organization as lead agency.

Whichever is selected, there appear to be some basic characteristics and conditions that apply to all. The executive agent would clearly have to have stature and visibility commensurate with the service responsibilities of an operational service activity. It would have a defined budget for its functions. Its initial responsibility would be to develop a time-phased transition and operating plan covering: (1) The establishment of the Board; (2) The organization for system management and regulation; (3) The system financing approach; (4) The development of a technical program; (5) The establishment of private and international participation approaches; and (6) The identification of implementation actions such as the executive orders and legislation required to establish authorities, transfer functions, and staff the activity. The executive agent would make maximum use of U.S. industry as a supplier and contract operator to hold down Federal staffing. Existing Federal capabilities--launch vehicles, data relays, and data centers--would be used instead of developing new facilities. Federal organizations--NASA, DOD, and others--would be tasked and reimbursed for development and procurement activities. (U)

Option 1. New Federal Agency

Under this approach, a new independent agency reporting to the President would be established by legislation for the purpose of implementing an operational terrestrial observation program. The Board would take the lead in proposing appropriate legislation to create such an entity. (U)

Advantages. Creation of a new agency would be a highly visible dramatic political commitment to the importance placed by the Administration on such program objectives as global information, effective management of diminishing resources and international cooperation. A new agency might be perceived to have no vested interest in a particular technical or management approach. (U)

Disadvantages. The same advantage could be achieved by other less expensive routes. A new agency takes time, money, and personnel to become effective. Proliferation of the Federal establishment may be taken in a negative light. Proposed legislation might be subject to considerable delay, changes, or redirection. The absence of any user or operator experience may reduce responsiveness and efficiency. (U)

Option 2. Joint Multiagency Activity

Under this approach, the Board would, under a Chairman selected by the President, employ more tan one executive agent for program implementation. For example, NASA would be responsible for space system definition and acquisition, NOAA for space segment operations, and Interior for ground data handling and dissemination. The Board would provide an overall integrative management function, while each agency would budget for and manage its allocated program function. (U)

Advantages. This approach appears to be the least perturbing to existing agency and department organizational structures, relying as it does on existing expertise without new staffing. It might be the most rapid way to begin, leaving open future options for institutional streamlining. It could provide for added specialized services by incorporating additional agencies, as required by new demands. It could be established without new organic legislation. (U)

Disadvantages. Under this approach, the Board becomes, de facto, a new interagency agency, and creates a very complex management arrangement. Substantial new staff and financial resources would be required by the Board. System architecture would be a Board, rather than executive agent, responsibility, thereby diluting accountability and increasing the probability of conflicts. The Board would have to exercise detailed day-to-day management control over several agencies to assure smooth system performance, thereby interfering with the agencies' own responsibilities. The system's budget would be vulnerable because of the multiple fund sources and the numerous Congressional Committees involved. (U)

Option 3. Lead Agency

Under this approach, one of the four agencies--NASA, DOI, DOC, or DOA--with applicable terrestrial observation systems experience would be selected as the program's executive agent under Board oversight. (U)

NASA

Advantages. NASA has developed experimental remote sensing spacecraft and ground data systems, including the Landsats, and is the developer and procuring agent for NOAA's operational METSATs. NASA is used to working with multiple user communities--domestic, foreign, military, and civil--in terms of system specifications and operational services. NASA has experience in both foreign participation and technology transfer to the private sector. The NASA Congressional Committees wish to see an operational system established and support an initial NASA management role. As manager and operator of an existing experimental space segment, NASA could effect a rapid transition to an operation system. (U)

Disadvantages. NASA does not want the assignment. The Space Act might have to be amended to permit it. NASA has no operational experience in ground data handling and dissemination. A major drawback of combining within the same agency a prime R&D mission and service operations for others is that one or the other tends to suffer in the management and budget processes. The NASA R&D emphasis might bias the operational system toward unneeded change and growth, increasing costs, and adversely affecting dependent users. (U)

Interior

Advantages. Interior wants the assignment and would establish a program management structure at the Departmental level. Interior's experience in the use of space data for its own mapping and resource management functions involves all major Earth resources disciplines, and qualifies the Department to understand and serve the needs of the diverse user community, both domestic and foreign. The EROS Data Center (EDC) is the major distributor of standard Landsat image and tape products and developmental activities at EDC and the Center for Astrogeology have made Interior a leader in digital image analysis techniques. The six Interior service centers represent the largest part of the nation's civil capability to convert satellite earth observation data to information products. The EROS Program has established channels with other Bureaus in Interior, other Federal agencies, state and local governments, and private sector users (including formal liaison with the private sector Geosat Committee). Interior works with other countries through the Geological Survey's Office of International Geology and the Department's Office of International Programs, through AID, the Inter-American Development Bank, and other organizations. (U)

Disadvantages. Interior has no experience in spacecraft design, procurement, or on-orbit management. As a major data user, Interior could feel pressures to focus on its own needs for its own programs. Interior's Congressional Committees have not had exposure to the front-end financing requirements of major multi-user space systems. Interior's main responsibility is widely perceived as the U.S. land area rather than the globe. It would take time to bring the program into being. (U)

Commerce

Advantages. Within DOC, all civil operational satellite remote sensing systems would be the responsibility of a single Federal agency, optimizing technical expertise in providing data to the terrestrial, meteorological, and oceanic user communities. The option for future interdisciplinary civil system integration and for reducing costs and improving services to all sectors, would be enhanced. DOC's NOAA has successfully operated three generations of polar orbiting meteorological satellites and two generations of geostationary environmental satellites. NOAA has experience in system design and secification, establishing major facilities for space operations, on-orbit control of spacecraft, and data acquisition, processing, archiving and dissemination. NOAA operates a global sensing system which includes international dissemination of the data and foreign contribution of subsystems to NOAA spacecraft. Responsibility for an open terrestrial system is compatible with NOAA's present mode of operation, including its geodetic and charting functions. NOAA has established data servicing arrangements with user agencies, notably, DOA, DOD, and DOT. The Commerce Congressional Committees understand large, public service satellite systems with a strong internation user component. (U)

Disadvantages. NOAA's main present responsibility lies in the atmospheric and oceanic areas rather than in the terrestrial area. Consequently, NOAA has less experience in dealing with the terrestrial user community. If resources are inadequate, NOAA might feel pressures to favor its oceanic and atmospheric responsibilities. Maintaining institutional and programmatic diversity for civil remote sensing activities may have a value which might be lost by placing all programs in a single agency. (U)

Agriculture

Advantages. Agriculture would accept the assignment. Agriculture is the largest single Federal user of land observation data and, following the precedent established that primary users of meteorological satellite data (DOD, DOC) are operators of satellite systems,

would be an appropriate lead agency for civil terrestrial observation space systems. If users are to pay for data, Agriculture will have to fund a significant portion of the system for the data products and might well go to Congress for the total system funding. Agriculture is testing, under operational conditions, procedures and methods for use of space data. Agriculture has a research responsibility for global improvement of decision-making in the agriculture and renewable resources areas. Agriculture's requirements for repetitive data in near-real time would make a system highly responsive to immediate user needs. Agriculture has had experience in remote sensing programs, with emphasis on land applications which can be transferred to space systems. The extensive network of (County) extension services and Land Grant Universities provides an established system to deliver data and information services to a wide variety of users, as well as to expand the use of space-acquired data. Agriculture's multi-faceted international activities include assistance to foreign countries in use of space-acquired data. (U)

Disadvantages. Agriculture has no experience in spacecraft design, procurement, or on-orbit management. As a major data user, Agriculture could feel pressures to focus on its own needs for its own programs. Agriculture's Congressional Committees have not had exposure to the front-end financing requirements of major multi-user space systems. It would take time to bring the program into being. (U)

Private Sector Directions

Whatever decisions are made on the Federal management role, there would be a continuing emphasis on encourageing the proper involvement of the private sector in operational terrestrial observations. At present, the private sector serves as the government's principal industrial resource for contracted hardware, software and operational support services. Private industry is not ready at this time to assume full financial responsibility for an operational civil terrestrial observations system and would require substantial Federal subsidy in the form of guarantees, monopoly, and liability limitations. Since the private sector is not yet ready to enter this market on its own, the Federal executive agent might take a variety of steps to encourage different degrees and forms of further private sector involvement, depending on external factors at the time. For example, the private sector role in "value-added" processing could be increased by discontinuing potentially competitive government activities. Another example might be a possible joint venture with private industry. Such an approach would require a considerable industrial investment, but there would be an assurance of economic viability because of the Federal partnership. Such an initial partnership could eventually lead to an all-private system. One example could be a privately owned ground segment supporting a Government satellite; another could be a privately owned satellite supported by a Government ground segment. Although these two examples are not issues for decision at this time, they are discussed below. (U)

Private Ownership of Ground Segment. Data processing and distribution within a regulated framework reflecting a reasonable profit are well within industrial competence and experience. The opportunity for marketing of specialized data products could be an added incentive for industry to participate with the Government as a regulated partner. While total costs to the Federal Government would not necessarily be reduced, commercial data operations would reflect the real cost to each user of his data consumption. Since this approach embodies certain elements of current legislative proposals, it is likely to enjoy Congressional support. (U)

On the other hand, a monopoly service to create an environment conductive to private investment in a major ground facility could result in domestic and international data policy problems. Regulation and supervision by the Federal partner could become burdensome, as would the problem of data ownership through copyright or sales contracts. The need for Federal subsidy in the ground segment would not result in major reductions of the taxpayers' burden. (U)

Private Ownership of Space Segment. The aerospace industry is competent to design, build, and operate an operational terrestrial acquisition system under Federal regulation and supervision. This approach should be fully fundable by the private sector and could benefit from the efficiency and innovation resulting from periodic competition for the government contracts. As such, it appears to constitute a viable first step of private sector involvement while keeping overall system control and tasking in government hands. With guarantees of direct readout, this arrangement might meet with foreign acceptance even if access fees approached commercial levels. It would also be likely to attract Congressional support. (U)

On the other hand, this alternative would set up a private monopoly which may be perceived as being against the public interest. As a private system functioning under the authority and supervision of the U.S. Government, it would require the establishment of a regulatory structure and the development--for national security reasons--of standby protection. The savings to the taxpayer may be limited, and commercial rates, if passed on to the user, may price some public service users out of the market. (U)

International Directions

It will be necessary to consider the role of international participation in civil operational terrestrial observation program under whatever Federal management approach is selected. There are varying degrees of foreign participation, ranging from present levels to eventual options for further internationalization in a UN or Intelsat mode. (U)

The degree of international involvement in the program would have a direct impact upon foreign attitudes toward all space activities. Outlined below, in order of increasing foreign involvement, are the advantages and disadvantages of some U.S. policy directions for foreign participation. (U)

Level 1.

Assuring continued non-discriminatory access by foreign users to operational earth remote sensing data. (U)

Advantages. This approach is consistent with our basic policy on open access to civil data and demonstrates U.S. commitment to help developing countries survey their resources. It retains flexibility to implement open data policy in various ways in a future operational system. It is consistent with national security and helps create an international environment generally favorable to our space program. Adopting this approach may provide a financial contribution to the cost of the program. (U)

Disadvantages. It is not explicit with regard to the continued operation of foreign ground station for Landsat data. This approach gives up some flexibility to change our basic data policy. (U)

Level 2.

Assuring non-discriminatory direct readout to foreign ground stations. (U)

Advantages. This approach continues our present policy of providing data to foreign users under specified terms and conditions. It demonstrates U.S. commitment to using remote sensing to help developing countries survey their resources. It may provide a contribution to the cost of the program and it helps create an international environment generally favorable to our space programs. (U)

Disadvantages. This approach may add to the cost of the planned U.S. satellites and it reduces U.S. flexibility to modify data policies. In addition it reduces the U.S. market share for processed Landsat data. Moreover, it commits the U.S. to given technologies that may not be optimum for its own national data requirements. (U)

Level 3.

Encouraging bilateral data processing arrangements and accommodating foreign instruments on U.S. satellites. (U)

Advantages. This approach carries existing civil METSAT practices over to the terrestrial area with a potential for reducing program costs or increasing services. It also helps create an international environment generally favorable to our space programs. (U)

Disadvantages. Adopting this approach may make the U.S. dependent on foreign suppliers of terrestrial data or instruments. The U.S. may have to forego certain technical developments under this approach and it could lead to technical program compromises. (U)

Level 4.

Encouraging development of complementary nationally operated satellite systems. (U)

Advantages. This approach is consistent with our commitment to international cooperation in remote sensing. It reinforces international acceptance of U.S. space activities. Adoption of this approach could provide more frequent coverage of various areas and provide a backup capability to our own systems. If we follow this approach it might reduce U.S. operational program costs and could reduce pressure for internationalizing remote sensing. (U)

Disadvantages. We could place our competitive technical leadership at risk by adopting this approach and it could make the U.S. dependent upon foreign systems for some data. Integration of U.S. civil and military systems would be more difficult under this approach and it could foreclose some opportunities to develop civil programs to improve U.S. competitive positions. Moreover, it would complicate arrangements for any private sector involvement in the U.S. program. (U)

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